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## PROGRESS OF SOVIET SCIENCE IN RAILROAD OPERATION

L. M. Kaganovich gave a new direction to the science of railroad operation in 1935-1936. The whole system of operation was reorganized from top to bottom in accordance with the new and advanced methods which were emerging in transportation as in other branches of the national economy.

As a result, rail transport in prewar times operated without interruption despite a sharp increase in freight traffic. During the war, rail transport played a tremendous role in meeting transportation requirements of the military command.

Technical planning and control of transport, utilization of railroad cars and locomotives, traffic capacity and schedules -- these aspects of railroad operation were all studied thoroughly by Soviet experts. An increase in traffic capacity, and a saving of time in turnover of railroad cars were the result of these studies.

In 1942, B. M. Maksimovich, Candidate in Technical Sciences, worked out a method of increasing the traffic capacity of single-track lines in time of war. This method was used successfully during the war on lines in front as well as rear areas.

With increasing commercial traffic, switching and scumting work greatly increased. New and better regulations had to be and were worked out.

The increase in freight traffic also brought forth the problem of development of shunting on our railroads. Professor V. N. Obratsov did important work in the field of classifying grades by working out a method for theoretical calculation of the proper height and contour of grades. Studies of resistance to the motion of a car while rolling down a grade were made by A. N. Frolov, B. V. Botmanov, and A. M. Dolaberdze.

Regulations for Soviet railroads and new railroad rates were worked out in the first years of the Soviet regime. Later, the increase in freight traffic necessitated mechanization of loading and unloading operations. Since

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1934, problems in the effective design and use of containers, and their effective transport and transshipment have been worked out satisfactorily by L. A. Kozlov. Even before the war, average loading of a freight car had increased 50 percent over 1913.

The refrigeration system of refrigerator cars was greatly improved under the Soviet regime. Even before the war, a new refrigeration system, providing substantially lower temperatures than in regular refrigerator cars, was developed by Engineer I. A. Kleymentov.

The increase of freight traffic demanded specialization of freight depots in important railroad centers. Such depot specialization by type of freight was executed at Moscow. Similar projects were carried out at many other important railroad centers. In 1939 the first textbook on effective freight-loading operations was written for use in higher technical schools.

In 1946-1947, a group of operational workers examined the problem of passenger-train weight and speed, and produced estimates for construction of passenger locomotives.

The postwar period will pose problems of building new cars and locomotives, expanding the rail networks, installing new types of communications, etc. Specifications for new types of cars and new types of freight, passenger, and shunting locomotives have been worked out.

One of the basic problems of railroad operation in the future will be that of speeding up car turnover and freight delivery. These objectives involve operational problems such as developing unified routing, making up trains of cars with the same type of coupling, organizing traffic to be hauled by internal-combustion locomotives and by electric locomotives, efficiently organizing traffic and freight handling at important rail centers, etc.

New techniques will be widely adopted. The use of radio, automatization, and mechanization will demand new kinds of traffic and operational controls which will assure the most efficient use of technical equipment.

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